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chusetts, normally employing 500 or more, and covering in December, 1920, 193,116 wage-earners. The dotted portion of the graph (both sexes) for the year 1921 represents the trend of employment in these 192 representative establishments.

If comparison is made with the chart prepared by Dr. Bradford it will be found that there is a very close correspondence in the fluctuations of the graphs for the states of New York, Wisconsin, and Massachusetts. This fact is of particular importance in that it indicates that whether or not the data cover merely a large number of *representative* establishments, as in the case of New York and Wisconsin, or *all* manufacturing establishments, as in the case of Massachusetts, the index numbers are directly comparable.

Chart II includes graphs for the four principal industries and a reproduction, on the same scale, of the chart for all manufacturing establishments. It will be noted that the fluctuations of the graphs representing employment in the *several* industries during the period 1914-20 vary widely from the fluctuations of the graphs representing employment in *all* industries, although in general it may be said that war-time demands and the demand for manufactured products during the latter part of 1919 and the early part of 1920 were reflected in the employment figures for each of the industries.

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MEDIANS OF WOMEN'S EARNINGS IN FOUR STATES

The Women's Bureau of the United States Department of Labor has recently completed the field work on the fourth of a series of investigations of wages of women in various states. The investigations were undertaken with several different aims in view, with resulting complications in the methods of treating the material.

It is not the policy of the Women's Bureau to go into any state to make this sort of survey without a definite invitation from state authorities or from organizations prominent enough to be able to guarantee adequate coöperation and a satisfactory use of the material. Thus the investigation in Kansas was made at the request of the State Industrial Commission, which desired information upon which to base wage awards. In Georgia the investigation was made at the request of several different organizations, including the State Federation of Women's Clubs and the League of Women Voters; in Rhode Island, at the request of the Governor and the State Consumers' League; and in Kentucky, at the request of the Governor and the State Federation of Women's Clubs.

To present figures which will fill the needs of organizations such as these is one of the functions of the Women's Bureau, but an equally important function is to add to the rather scant statistical material which is now available regarding wages of women in industry. The satisfactory adjustment of these two functions presents many difficulties from the standpoint of the person interested in statistics.

The following figures give the outstanding facts as disclosed by the material gathered in the four states:

MEDIAN WEEKLY EARNINGS OF WOMEN IN ALL INDUSTRIES INVESTIGATED

| State | Median earnings | No. of women reporting | Date of investigation |
|--------------------------------------|-----------------|------------------------|-----------------------|
| Kansas | \$11.80 | 4,329 | June 1919-June 1920 |
| Georgia | 12.20 (white) | 6,566 (white) | Oct. 1920-Apr. 1921 |
| | 6.20 (colored) | 1,554 (colored) | |
| Rhode Island | 16.85 | 7,780 | Oct. and Nov. 1920 |
| Kentucky (preliminary figures) . . . | 11.05 (white) | 7,840 (white) | Sept., Oct., and |
| | 8.30 (colored) | 1,253 (colored) | Nov. 1921 |

The figures from which these medians were computed were the actual amounts of money received by the women according to the record on the pay-roll at the time of the investigation, or on the pay-roll for a week in which a representative number of hours had been worked in cases where the current pay-roll covered a week during which hours had been abnormal.

It is readily seen that the amounts quoted—without correlation with many other factors—by no means tell the entire story. In the detailed reports on wages careful correlations are made of the relation between wages and such factors as the type of industry, period of the investigation, actual hours worked, actual hours in relation to scheduled hours, period of unemployment, age, experience, race, and, where available, cost of living. Thus far, because of the many different industries included in each investigation, it has not been practicable to discuss the relation between wages and occupation.

In preparing such wage material the Women's Bureau must steer between the Scylla and Charybdis of presenting figures too complicated statistically for easy comprehension and use for publicity and educational purposes, or with so few correlations that they are not accurate. In other words, "accurate statistics" are an essential requirement of the type of report issued by the Bureau, but "human statistics" are an essential requirement of the kind of use to which the reports are put.

The median, such as those quoted, of the actual amounts earned during one representative week for specified industries and for all industries is naturally the figure most easily understood and most adaptable to publicity and other general statements. Even with this simple figure, however, it is necessary to interpret the word "median" into terms of "one half received less, and one half more." If the story, or as much of it as possible, must be told in a few paragraphs of words of one syllable, the median of the actual amounts earned during one week seems to be the figure which is most nearly representative of conditions throughout the state, for several different reasons. First: The week for which pay-roll figures are taken is carefully selected in each plant so as to be representative of the normal schedule with regard to hours. Second: The week's earnings are recorded for every woman employed in the plant, thus eliminating much chance of an unusual proportion of women who have worked part-time. That a number of women who have worked only part-time should be included in the record is inevitable, but as every industry has many employees who on occasions work part-time, from necessity or from choice, a rate which includes only full-time workers would be no more accurate than a rate which includes both. Third:

A median rate is much less affected than an average by the extreme items under consideration, and therefore indicates more accurately the general situation. Fourth: From the standpoint of the woman worker who has to meet a weekly bill for board and lodging and other expenses, the important thing is the amount actually earned during a week. Few wage-earners of the type included in these investigations have a reserve fund to draw upon during weeks of scanty earnings. That she is young or inexperienced, that the plant was running only part-time because of lack of orders, that she was ill or that the machine on which she worked had broken down, are conditions which have no effect upon the cost of board and lodging, of clothes, and of carfare for the woman wage-earner.

At present, while women's wages are so likely to be far below any adequate standard of living costs, if there is a choice it is from the woman's point of view that statistics on this subject should be compiled.

For the sake of statistical accuracy, however, and for the benefit of administrative measures both within the industries themselves and in other fields, simple but accurate figures should be available for comparative purposes. These figures should permit of a just evaluation of the standing of different industries with regard to the wage paid their employees. It is obvious that a wage of \$15 a week paid to a salesgirl in a 5-and-10-cent store in a country town cannot be compared justly with a wage of \$22 a week paid to a machine operator in a city factory manufacturing electrical machinery. In the former case the girl may be young and inexperienced, her duties may require only slight skill or training, and the cost of living in the country is likely to be less than in the city. The machine operator is likely to be older, her earnings may be the result of many years' experience and careful training, the work may be exacting physically and mentally, and her hours may be longer. In such a case can there be said to be a real difference of \$7 a week in the earnings of the two girls, and can the electrical appliance factory be rated nearly 50 per cent higher than the 5-and-10-cent store?

An index number of wages which took into consideration some of the above-mentioned factors would be of invaluable assistance in presenting this subject. Until a method is devised for computing such a figure the simple median of weekly earnings seems to be the most graphic and the least liable to be misleading of the various figures presented in the standard wage report.

MARY N. WINSLOW

A PERCENTAGE PROTRACTOR

DESIGNED FOR USE IN THE CONSTRUCTION OF CIRCLE CHARTS OR "PIE DIAGRAMS"

For expressing component parts the circle chart or "pie diagram" is admittedly inferior to the composite bar chart. However, there are times when it is advantageous for the sake of popularization to make use of the "pie diagram."

The accompanying cut represents a protractor designed especially for use in the construction of circle charts. The ordinary protractor that is used in subdividing a circle is divided into parts to represent degrees. When attempting to construct a circle divided into sections to show the component parts of a whole—